L 25646-65
ACCESSION NR: AR5003759

forms and methods of organization and orientation work are used. A brief descrip-
tion is given of the results of a competition between the inventors of the oblast
for an efficiency proposal on comprehensive mechanization of industrial processes,
economy of metals, raw materials and electric power. In the battle for the
development of the movement of inventors and industrial efficiency experts, an
important part is played by public design organizations. There are 230 public
design offices in the Khar'kovskaya oblast employing 1800 persons. The develop-
ment of collective forms of invention and improved production methods means a
transition from improvement of separate tools and mechanisms, operations and tech-
nological processes to general and total industrial mechanization and automation.
Nevertheless, insufficient practical use is being made of the creative activity of
inventors and efficiency experts. Patents for 26,400 inventions were granted in
1957-1959, and only 4650 inventions in all were introduced into production in the
same period. The instructions of the Party and the Government on including the
realization of efficiency proposals in plans on new technology or in plans for
organizational and technical measures are not always complied with. Analysis
shows that realization of nearly half the proposals is delayed because the tech-
nological equipment is not manufactured in time. Research shops where experi-
mental models may be made are far from being available in every enterprise. In
many economic regions conditions are ripe and there is a potential for creation
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ACCESSION NR: AR5003759

of experimental departments and workshops as well as large factories operating on
the principle of existing enterprise experiences. The defects in the system of
material incentive for inventions and their introduction into production are a
serious drag on the development of technical creativity.

SUB CODE: GO   ENCL: 00

Card 3/3

1. SHEKTMAN, I. A.

2. SSSR (600)

4. Nickel

7. Gyromagnetic resonance in nickel at 10cm a wave length near the Curie-point.
    Izv. AN SSSR Ser. fiz. 16 No. 4, 1952

9. Monthly Lists of Russian Accessions, Library of Congress, March 1953, Unclassified.

SHEKTMAN I. V.   PA   171T10

USSR/Electricity - Electric Machines   Mar 50
                    Windings

"Calculating the Leakage of End Windings," I. V.
Shektman, Cand Tech Sci, Moscow Power Eng Inst
imeni Molotov.

"Elektrichestvo" No 3, pp 24-29

Proposes method for calculating subject leakage
inductance. Gives formulas and curves for deter-
mining the inductance and mutual inductance of
sections of finite length. Results confirm method
proposed is correct and formulas are accurate. Sub-
mitted 18 Sep 49.

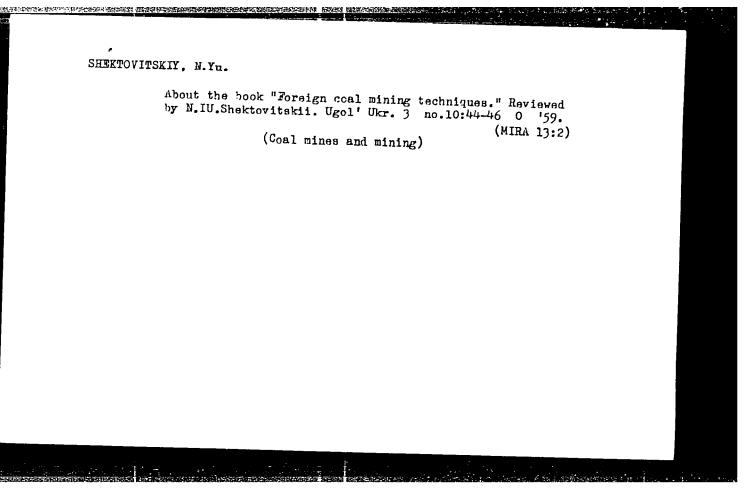   171T10

SHEKTMAN, M.M.; FEDERMESSER, K.M.

Inferior vena cava syndrome in pregnancy. Akush. i gin. 40 no.4:
142-143 Jl-Ag '64.   (MIRA 18:4)

1. Institut akusherstva i ginekologii (dir. - prof. O.V.Makeyeva)
Ministerstva zdravookhraneniya SSSR, Moskva.

SHEKTOVITSKIY, N.Yu.

About the book "Foreign coal mining techniques." Reviewed
by N.IU.Shektovitskii. Ugol' Ukr. 3 no.10:44-46 O '59.

(MIRA 13:2)

(Coal mines and mining)

S/064/61/000/007/004/005
B124/B206

AUTHORS: Chekhov, O. S., Anokhin, V. N., Shekun, B. N., Khiterer, R.Z.

TITLE: Investigation of hydrodynamic processes in a pseudo-diluted
             solid-particle layer under high pressure

PERIODICAL: Khimicheskaya promyshlennost', no. 7, 1961, 48 - 50

TEXT: The hydrodynamics of pseudo-diluted solid-particle layers were
investigated at 1-300 kg/cm^2 and 25-30°C with a stoichiometric gas mixture
used for the synthesis of ammonia. Coke particles of good electrical con-
ductivity and metallic needle- and lamella-shaped filings were used as
solid phase. The critical rate velocity of the gas mixture and the height
of the pseudo-diluted solid-particle layer during the process were deter-
mined. The gas mixture was purified of steam, oil droplets and other
impurities, and ducted into a vertical, cylindrical high-pressure column
with an inner diameter of 25 mm which contained the solid-particle layer.
The mixture was then throttled to atmospheric pressure and its consumption
was measured with a rheometer. The transition of the solid-particle layer
into the pseudo-diluted state, which corresponded to the critical gas

Card 1/3

velocity, was brought about by closing the circuit. Above the solid-
particle layer there was an electric contact which touched the layer after
the beginning of the expansion and thus closed the circuit. The second
electric contact was connected to the housing of the high-pressure column.
For the determination of the height of the pseudo-diluted solid-particle
layers, the distance of the upper surface of the stationary layer from the
electric contact in the high-pressure column was varied. The determina-
tion results obtained during opening were practically equal to those ob-
tained during closing of the circuit. The experimental results obtained
for the critical gas velocities were treated according to the method pro-
posed in Ref. 1 (A. I. Rychkov, N. A. Shakhova, IFZh, No. 9, 92 (1959))
for determining the critical gas velocities at various temperatures and
atmospheric pressure (Ref. 2: O. M. Todes, A. K. Bondareva, Khim. nauka i
prom., $\underline{2}$, No. 2 (1957)). First, the critical gas velocity ω_{cr} (in m/sec)
at atmospheric pressure was determined experimentally, this value being a
function of the mean particle diameter d_{mean} and the density of the
particles, under absolutely equal conditions. From the known value ω_{cr},
the equivalent diameter d_e of the pores in the layer (in m) was calculated

Card 2/9

Investigation of...

from the equation $d_e^2 - (0.8\omega_{cr}^2 \cdot \gamma_g \cdot 1/\Delta P \cdot \epsilon_o^2 g) \, d_e - (73\nu\omega_{cr} \cdot \gamma_g \cdot 1/\Delta P \epsilon_o g) = 0$
(1), where ω_{cr} is the gas velocity related to the total column diameter, γ_g the density of the gas, l the height of the stationary solid-particle layer, ΔP the pressure difference, ϵ_o the porosity of the stationary solid-particle layer, g the gravitational acceleration and ν the kinematic viscosity of the gas. The critical velocity of the gas at any pressure was determined from the equivalent diameter by the following equations; 1) for laminar conditions at $Re < 15$ and $Ar(1-\epsilon_o) < 1100$: $Re = 0.0137Ar(1-\epsilon_o)$ (2); 2) for transition conditions at $15 < Re < 150$ and $1100 < Ar(1-\epsilon_o) < 28.2 \cdot 10^3$; $Re = 0.101 \left[Ar(1-\epsilon_o)\right]^{0.714}$ (3); 3) for turbulent conditions at $150 < Re < 1000$ and $28.2 \cdot 10^3 < Ar(1-\epsilon_o) < 83 \cdot 10^4$: $Re = 0.512 \left[Ar(1-\epsilon_o)\right]^{0.556}$ (4); under the given conditions, Reynolds' criterion is $Re = \omega_{cr} \cdot d_e/\nu \cdot \epsilon_o$ (5), and Archimedes' criterion $Ar = (gd_e^3/\nu^2) \cdot \left[(\gamma_p - \gamma_g)/\gamma_g\right]$ (6), where γ_p denotes the apparent density of the solid particles. Fig. 1 shows the

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Investigation of...   S/064/61/000/007/004/005
                                     B124/B206

experimental results obtained with coke and bronze particles, in the
coordinates pressure - critical velocity; likewise, the curves of Eqs. (2),
(3) and (4) are recorded with parameters corresponding to experimental
conditions. Fig. 2 shows the results obtained in experiments with coke,
bronze and aluminum particles, in the coordinates Ar - Re. Eqs. (7) and
(8): $Re' = Ar'/\left\{150\left[(1-\varepsilon_0)/\varepsilon_0^3\right] + \sqrt{(1.75/\varepsilon_0^3)\sqrt{Ar'}}\right\}$ (7) or
$Ar' = 150\left[(1-\varepsilon_0)/\varepsilon_0^3\right] Re' + 1.75 (1/\varepsilon_0^3)(Re')^2$ (8), where $Re' = (\omega_{cr} d/\nu)$ and
$Ar' = (gd^3/\nu^2)\left[(\gamma_p - \gamma_g)/\gamma_g\right]$, allow the calculation of the pseudo-dilution
rate, accurate to 20%. Fig. 3 shows the experimental data for coke parti-
cles with a mean diameter of 1.5 mm at various pressures, plotted in the
coordinates gas velocity W - relative height of the pseudo-diluted layer
$H_{rel} = H/H_0$ (H is the height of the pseudo-diluted layer and H_0 that of the
stationary layer); and Fig. 4 the results obtained in experiments with coke
particles of 0.24 and 0.83 mm diameter plotted in the logarithmic coordi-
nates Ar' - Re'. The results for the relative height of the pseudo-diluted
layers which determine their porosity, may be calculated with an accuracy
of 10% from the equation (see Ref. 3: V. D. Goroshko, R. B. Rozenbaum,

Card 4/9

CHERNOV, C.S.; ALEXID, V.L.; G___, N.M.; _____, ___.

Hydrodynamic processes in a fluidized bed of solid particles under high pressure. Khim. prom. no.7:492-494 Jl '61.
(MIRA 14:7)

(Fluidization)

SHEKUN, B. N.

S/080/62/035/001/003/013
D246/D304

AUTHORS: Anokhin, V. N., Mukhlenov, I. P., Traber, D. G., Chek-
              nov, O. S., Shekun, B. N., and Khiterer, R. Z.

TITLE: Study of the ammonia synthesis in a suspended catalyst
              layer

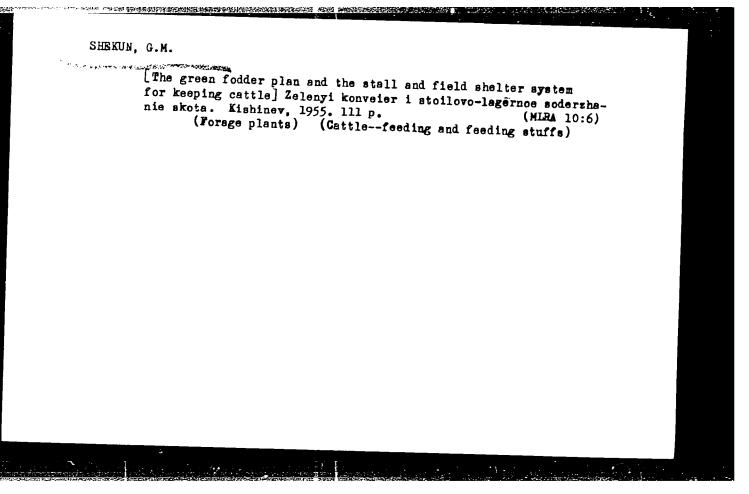PERIODICAL: Zhurnal prikladnoy khimii, v 35, no. 1, 1962, 37-42

TEXT: The authors studied NH_3 synthesis using a suspended layer
of activated Fe catalyst (type ГК-4 (GK-1)) with an average par-
ticle diameter of 0.18 mm. The temperature dependence of the reac-
tion rate was found to conform to the Arrhenius equation and the
activation energy of the catalyst was calculated to be 41,000 kcal/
kg-mole, which is in agreement with results obtained by other wor-
kers. At pressures of 100, 200 and 300 atm, and over the tempera-
ture range studied (400 - 560°C) the reaction rate depended consi-
derably on the grain size of the catalyst. The linear rate of gas
flow also affected the degree of uniformity of mixing the gaseous
and fluidized catalyst phases and, accordingly, the reaction rates.
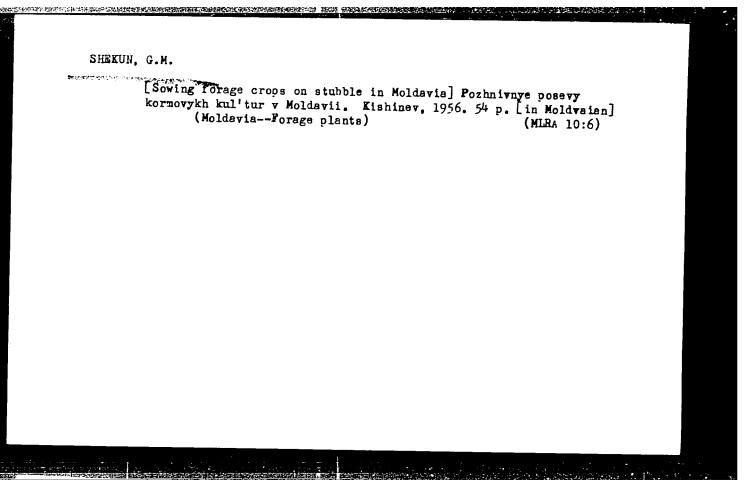
Card 1/2

MUKHLENOV, I.P.; TRABER, D.G.; ANOKHIN, V.N., SAVILOV, D.M.; SHEKUN, B.N.

Synthesis of ammonia in a fluidized catalyst bed. Zhur.
prikl. khim. 37 no.2:233-239 F '64.   (MIRA 17:9)

1. Leningradskiy tekhnologicheskiy institut imeni Lenosoveta i
Novomoskovskiy khimicheskiy kombinat.

SHEKUN, G.M.

[The green fodder plan and the stall and field shelter system
for keeping cattle] Zelenyi konveier i stoilovo-lagernoe soderzha-
nie skota. Kishinev, 1955. 111 p.   (MIRA 10:6)
        (Forage plants)   (Cattle--feeding and feeding stuffs)

SHEKUN, G.M.

[Sowing forage crops on stubble in Moldavia] Pozhnivnye posevy
kormovykh kul'tur v Moldavii. Kishinev, 1956. 54 p. [in Moldvaian]
(Moldavia--Forage plants)   (MLRA 10:6)

COUNTRY   : USSR
CATEGORY   : Meadow Cultivation.

ABS. JOUR.   : RZhBiol., No.23, 1958, No. 104581

AUTHOR   : Shekun, G.M
INST.   : —
TITLE   : On the Organization of Seeded Pastures and Hay Fields
                 in Moldavia.

ORIG. PUB.   : Agrikultura shi viteritul Moldovey, 1957, No. 7, 39-43;
                 Zemiedeliye i zhivotnovodstvo Moldavii, 1957, No. 7, 40-44

ABSTRACT   : Data obtained by the scientific and research institutions
                 of Moldavia permit recommendation of the following grass
                 mixtures for the creation of cultivated pastures on low-
                 lying plots: alfalfa 40-50%, smooth brome   50-60% or
                 alfalfa 30%, smooth brome   40% and meadow fescue 30%.
                 Recommended for sowings on slopes and elevated plots are
                 esparcet 40-50%, smooth brome grass 50-60%, or esparcet
                 40%, smooth brome grass 20%, wheatgrass 20%, and tall cat-
                 grass 20%. For seeded annual pastures, the principal cul-
                 ture is Sudan grass, then corn, sorgo, Italian millet,
                 vetch with oats. -- Ye. T. Zhukovskaya

Card: 1/1

USSR / Cultivated Plants. Grains. Legumes. Tropical   M-1
         Cereals.

Abs Jour   : Ref Zhur - Biologiya, No 2, 1959, No. 6255

Author   : Shekun, G.
Inst   : Acad. Sci. USSR, Moldavian Branch
Title   : Cultivation Prospects and Some Agrotechnical
             Problems with Sorghum in Moldavia

Orig Pub   : Zemledeliye i zhivotnovodstvo Moldavii, 1958,
             No 1, 5-12

Abstract   : Data on the testing of sorghum in the variety
             net for study in the Moldavian branch, Acad.
             of Sci. USSR and at the field cultivation
             station, Kishenev Agricultural Institute, is
             given. Data on the results of cultivation of
             sorghum in some kolkhozes and sovkhozes of
             the republic are also given. The yielding

Card 1/3

         Cereals.

Abs Jour   : Ref Zhur - Biologiya, No 2, 1959, No. 6255

             capacity of sorghum for green fodder, silage
             and grain in comparison with corn and Sudan
             grass was studied at the experimental station
             of field cultivation of the Kishenev Institute.
             Chemical analyses of the green mass, silage
             and grain were carried out. Time and methods
             of sowing, norms of sowing, time of mowing
             were studied. Mixed sowings of sorghum with
             corn and leguminous crops, as well as stubble
             sowings of sorghum after various crops were
             tested. Appropriate recommendations are given
             on all these problems and they permit to affirm
             the expediency of introducing sorghum as a
             staple crop in Moldavia. The expediency of
             increasing the sowings of Chinese sugar cane

Card 2/3

SHEKUN, G.M.; KACHANOVA, N., red.; POLONSKIY, S., tekhn.red.

[Growing sorghum for forage] Kul'tura sorgo na korm. Kishinev, Gos.izd-vo "Kartia Moldoveniaske," 1960. 130 p.
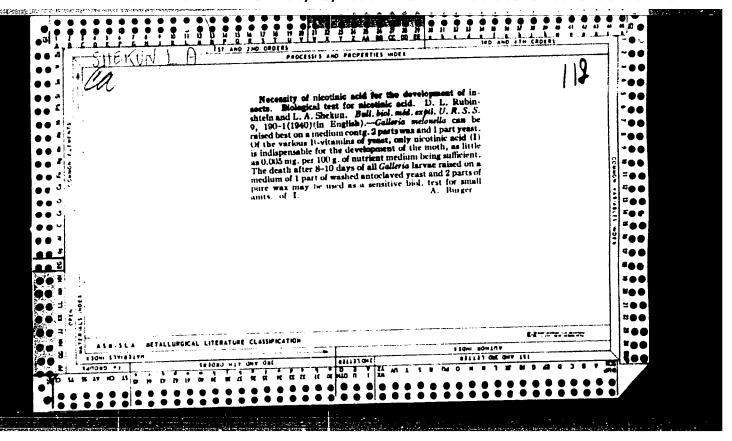
(MIRA 13:12)

(Sorghum)
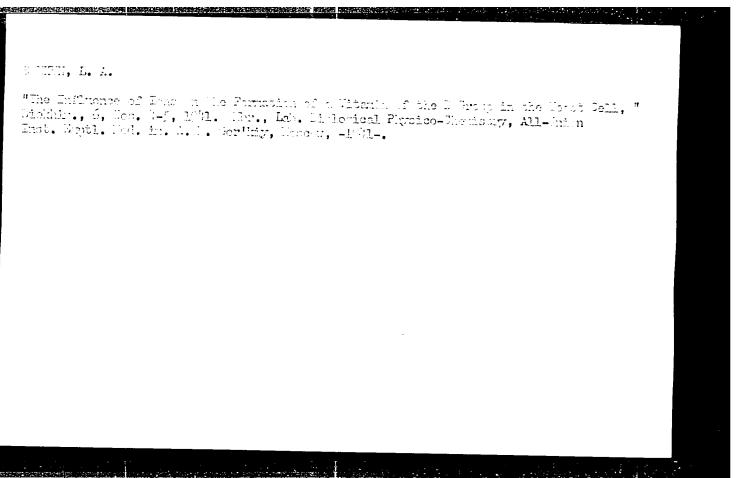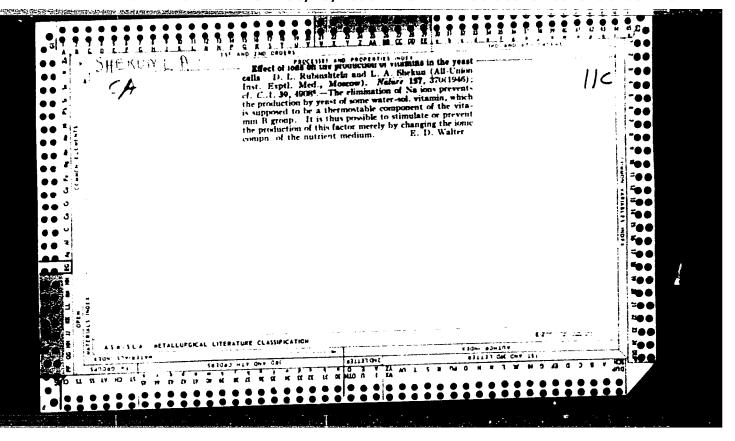
SHEKUN, G.M., kand. sel'skokhoz. nauk

Sorgo in the fields of Moldavia. Zemledelie 25 no.11:51-55
N '63.   (MIRA 17:2)

1. Kishinevskiy sel'skokhozyaystvennyy institut.

SHEKUN, Grigoriy Mikhaylovich,

[Growing sorgo in the ... ... It. biological charac-
teristics] Kul'tura ... ... e biologicheskie oso-
bennosti. ..oskva, ..., ...,   (MIRA 18:2)

SHEKUN L A

PROCESSES AND PROPERTIES INDEX

1st AND 2ND ORDERS

3RD AND 4TH ORDERS

112

Necessity of nicotinic acid for the development of insects. Biological test for nicotinic acid. D. L. Rubinshtein and L. A. Shekun. *Bull. biol. méd. exptl. U. R. S. S.* 9, 190-1(1940)(in English).—*Galleria melonella* can be raised best on a medium contg. 2 parts wax and 1 part yeast. Of the various B-vitamins of yeast, only nicotinic acid (I) is indispensable for the development of the moth, as little as 0.005 mg. per 100 g. of nutrient medium being sufficient. The death after 8–10 days of all *Galleria* larvae raised on a medium of 1 part of washed antoclaved yeast and 2 parts of pure wax may be used as a sensitive biol. test for small amts. of I.

A. Burger

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

SMITH, L. A.

"The Influence of Iron on the Formation of a Vitamin of the B Group in the Yeast Cell," Biokhim., 6, Nos. 3-5, 1941. Otv., Lab. Biological Physico-Chemistry, All-Union Inst. Exptl. Med. im. A. M. Gorkiy, Moscow, -1941-.

SHEKUN L. A.

CA

11c

PROPERTIES AND PROPERTIES NOTE

Effect of iodine on the production of vitamins in the yeast cells D. L. Rubinshtein and L. A. Shekun (All-Union Inst. Exptl. Med., Moscow). *Nature* 157, 370(1946); cf. C.A. 39, 4908°.—The elimination of Na ions prevents the production by yeast of some water-sol. vitamin, which is supposed to be a thermostable component of the vitamin B group. It is thus possible to stimulate or prevent the production of this factor merely by changing the ionic compn. of the nutrient medium. E. D. Walter

METALLURGICAL LITERATURE CLASSIFICATION

SHEKUN, L.A.

Experimental vitamin B1 deficiency in dogs [with summary in English].
Vop.pit. 16 no.6:29-33 N-D '57.   (MIRA 11:3)

1. Iz laboratorii Fizologii i patologii pishchevareniya (zav. -
doktor meditsinskikh nauk S.I.Filippovich) Instituta normal'noy
i patologicheskoi fiziologii AMN SSSR, Moskva.
        (VITAMIN B1 DEFICIENCY, experimental,
            din dogs (Rus))

SHEKUN, L.A.

Effect of vitamin B₁ on the secretory function of digestive glands.
Report No.1. Secretion of the gastric glands in experimental vitamin
B1 deficiency in dogs.[with summary in English]. Biul.eksp.biol. i
med. 44 no.7:45-49 Jl '57.   (MIRA 10:12)

1. Iz laboratorii fiziologii i patologii pishchevareniya (zav. -
deystvitel'nyy chlen AMN SSSR prof. I.P.Razenkov [deceased]) Insti-
tuta normal'noy i patologicheskoy fiziologii (dir. - deystvitel'nyy
chlen AMN SSSR prof. V.N.Chernigovskiy) AMN SSSR, Moskva. Predstavle-
na deystvitel'nym chlenom AMN SSSR prof. V.N.Chernigovskim.
          (GASTRIC JUICE,
             secretion in exper. vitamin B1 defic. (Rus))
          (VITAMIN B1 DEFICIENCY, experimental,
             eff. on gastric secretion (Rus))

SHEKUN L A

Sec 9 o 13/7 Surgery July 59

3952. THE ABSORPTIVE FUNCTION OF THE SMALL INTESTINE IN SUB-
TOTAL RESECTION OF THE STOMACH. I. CHANGES IN THE ABSORP-
TION OF GLUCOSE AND WATER BY THE SMALL INTESTINE AFTER
PARTIAL RESECTION OF THE STOMACH (Russian text) - Shekun L. A.
Inst. of Norm. and Pathol. Physiol., USSR Acad. of Med. Scis, Moscow -
BYULL. EKSPER. BIOL. I MED. 1958, 45/9 (19-23) Graphs 3

Experiments were conducted on dogs by the administration of glucose into the
digestive tract and followed by study of the glycaemic curve. It was demonstrated
that after stomach resection the blood sugar level (before meals) and the charac-
ter of the glycaemic curve show considerable changes. Experiments carried out
on isolated intestinal sections show that as a result of stomach resection the ab-
sorption of glucose decreases during the first month after the operation and then
rises within the normal limits. The dogs were observed from 3 months to 1.5 yr.
Absorption of water is greatly increased after the resection and remains in this
condition for a long time. The absorption of glucose and water, as well as the
blood sugar level and the character of the glycaemic curve, depends on the general
condition of the animal after the stomach resection.

SHEKUN, L.A.

Relation of changes in higher nervous activity to gastric secretory functions in Vitamin B1 deficiency in dogs [with summary in English] Biul.eksp.biol. i med. 46 no.7:3-7 Je '58   (MIRA 11:7)

1. Iz laboratorii fiziologii i patologii pishcevareniya (zav. - deystvitel'nyy chlen AMN SSSR i P. Razenkov [deceased]) Instituta normal'noy i patologicheskoy fiziologii (dir. - deystvitel'nyy chlen AMN SSSR V.N. Chernigovskiy) AMN SSSR, Moskva. Predstavlena deystvitel'nym chlenom AMN SSSR V.N. Chernigovskim.
                (CENTRAL NERVOUS SYSTEM, physiology,
                      higher nerv. activity, eff. on gastric secretion in
                      vitamin B1 defic. in dogs (Rus))
                (VITAMIN B1 DEFICIENCY, experimental
                      eff. of higher nerv. activity changes on gastric secretion
                      in dogs (Rus))
                (GASTRIC JUICE,
                      secretion, eff. of higher nerv. activity changes in
                      vitamin B1 defic. in dogs (Rus))

SHEKUN, L.A.

Absroption by the small intestine following subtotal gastrectomy.
Report No.1:Modification of glucose and water absorption by the small
intestine following partial gastrectomy. Biul. eksp.biol. i med.
46 no.9:19-23 S'58   (MIRA 11:11)

1. Iz laboratorii fiziologii i patologii pishchevareniya
(zav. - prof. S.I. Filippovich) Instituta normal'noy i patologicheskoy
fiziologii (dir. - deystvitel'nyy chlen AMN SSSR, Moskva.
Predstavlena deystvitel'nym chlenom AMN SSSR V.N. Chernigovskim.
            (WATER, metab.
                small intestinal absorp in pertially gastrectomized
                dogs (Rus))
            (GLUCOSE, metab.
                same (Rus))
            (INTESTINES, small, physiology,
                glucose & water absrop. in partially gastrectomized
                dogs. (Rus))
            (GASTRECTOMY, effects,
                on small intestine glucose & water absrop. in dogs
                (Rus))

SHEKUN, L.A.

Disturbance in the activity of the digestive organs in experi-
mental vitamin B, deficiency in dogs and its reduction under
the influence of vitamin therapy. Vitaminy no.4:117-122
'59.   (MIRA 12:9)

1. Laboratoriya fiziologii i patologii pishchevareniya Instituta
normal'noy i patologicheskoy fiziologii Akademii meditsinskikh
nauk SSSR, Moskva.
              (DIGESTIVE ORGANS-DISEASES)

SHEKUN, L.A.

Changes in alimentary excitability in experimental vitamin B_1 deficiency and subsequent vitamin therapy in dogs. Vop.pit. 19 no.1:56-61 Ja-F '60.   (MIRA 13:5)

1. Iz laboratorii fiziologii i patologii pishchevareniya (zav. - prof. S.I. Filippovich) Instituta normal'noy i patologicheskoy fiziologii AMN SSSR, Moskva.
          (VITAMIN B_1 experimental)
          (GASTROINTESTINAL SYSTEM physiology)

VINOKUROV, V.M.; ZARIPOV, M.M.; STEPANOV, V.G.; POL'SKIY, Yu.Ye.;
    CHIRKIN, G.K.; SHEKUN, L.Ya.

    Electronic paramagnetic resonance in natural chrysoberyl.
    Fiz. tver. tela 3 no.8:2475-2479 Ag '61.   (MIRA 14:8)

    1. Kazanskiy gosudarstvennyy universitet im. V.I.Ul'yanova-
    Lenina.
                (Paramagnetic resonance and relaxation)
                (Chrysoberyl)

ANTIPIN, A.A.; KURKIN, I.N.; SHEKUN, L.Ya.

Electron paramagnetic resonance of Yb^{3+} ions in hexagonal ZnS.
Fiz. tver. tela 7 no.3:938-939 Mr '65.

(MIRA 18:4)

1. Kazanskiy gosudarstvennyy universitet imeni Ul'yanova-Lenina.

KURFIN, L.N.; MOROZOV, A.M.; SHEKUN, L.Ya.

Paramagnetic resonance of cerium in PbMoO$_4$ single crystals. Dokl. AN SSSR 161 no.2:322-323 Mr '65.   (MIRA 18:4)

1. Kazanskiy gosudarstvennyy universitet. Submitted October 10, 1964.

SHEKUN, L. G., AVAKUMOV, V. I., AND ALTSHULER, S. A., (Kazan)

"Resonance Paramagnetic Absorption of Ultrasound in Some Salts of Rare-Earth and Iron groups of Elements," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.

SHEKUN, L. Ya.

Shekun, L. Ya.: "Spin-lattice interactions in the salts of rare-earth
        elements." Min Higher Education USSR. Kazan' Order of Labor Red
        Banner State U imeni V. I. Ul'yanov-Lenin. Kazan', 1956.

So: Knizhanya letopis' No 27, 1956. Pages 94-109; 111

Shekun, L. Ya.

AUTHOR: Shekun, L. Ya.

TITLE: On the Rotation of Polarization Plane of Microwaves
              in Paramagnetics (O vrashchenii ploskosti polyarizatsii
              mikrovoln v paramagnetikakh)

PERIODICAL: Izvestiya Akademii Nauk, Vol. XX, #11, pp 1262-1264
              1956, USSR, Seriya fizicheskaya

ABSTRACT: In order to find the dependence of polarization plane
              rotation on the intensity of a constant magnetic field
              and radiation frequency, the author establishes the
              dependence of the components of the magnetic suscept-
              ibility tensor X on these quantities.

              In view of the absence of a quantum theory of X-tensor
              for paramagnetics, the author applies the thory of
              magnetic susceptibility in paramagnetic gases, making
              use of the results of Schwinger's work (2).

              On the basis of the formulae derived by the author,
              he constructs the curves for absorption, dispersion
Card 1/2   and polarization plane rotation for various values of

Shekun, L. Ya

AUTHOR: Shekun, L

TITLE: Connection between ... ... nance absorption
              and Paramagnetic Resonance Rotation (Svyaz' meshdu
              paramagnitnym rezonansnym pogloshcheniyem i parama-
              gnitnym rezonansnym vrashcheniyem)

PERIODICAL: Izvestiya Akademii Nauk, Vol XX, #11, pp 1265-1266
              1956, USSR, Seriya fizicheskaya

ABSTRACT: Altshuler (3) derived integral correlations between
              the real and imaginary components of magnetic susc-
              eptibility, but the use of these correlations prese-
              nts some difficulties. The author shows that there
              exists a uniquely determined connection between the
              imaginary component of susceptibility and parama-
              gnetic resonance rotation, free from any arbitrary
              quantities The formulae derived in this article
              make it possible to find the absorption curve, if
              the experimental rotation curve is known, and vice
Card 1/2   versa.

TITLE: Connection between Paramagnetic Resonance Absorption and Paramagnetic Resonance Rotation (Svyaz' meshdu paramagnitnym rezonansnym pogloshcheniyem i paramagnitnym rezonansnym vrashcheniyem)

This relation can prove to be useful in finding absolute values of the imaginary component of susceptibility since their measurements are more complicated than the measurements of the absolute values of rotation angles. The bibliography lists 3 references, all of them Slavic (Russian)

INSTITUTION: State University imeni Ulyanov-Lenin in Kazan

PRESENTED BY:

SUBMITTED: No date

AVAILABLE: At the Library of Congress

Card 2/2

USSR/Physical Chemistry - Electrochemistry   B-12

Abs Jour   : Referat Zhur - Khimiya, No 2, 1957, 3946

Author   : Nigmatullin R.Sh., Shekun L.Ya.
Inst   : Kazan' University
Title   : Possibility of Utilizing Sinusoidal Voltage in
               Quantitative Evaluation of Reversibility of Electrode
               Processes

Orig Pub   : Uch. zap. Kazanskogo un-ta, 1956, 116, No 1, 95-98

Abstract   : Calculation of the shape of curves (I, E) that are obtai-
               ned on application of sinusoidal voltage to polarographic
               cell with a Hg-drop electrode; it is assumed that the
               electrode process (EP) is fully reversible. The curve
               (I,E) is closed and symmetrical in relation to its center,
               and consists of two identical branches, approximating in
               shape the curve that is obtained on application of perio-
               dic triangular voltage (Sevcik A., Coll. Czech. Chem.
               Comm., 1948, 13, 349). Deviations of experimental

Card 1/2   - 187 -

NIGMATULLIN, R.Sh; SHEKUN, L.Ya.

Oscillographic apparatus for investigation of reversibility of electode processes. Uch.zap.Kaz.un. 116 no.5:103-107 '56.

(MLRA 10:4)

1. Kafedra molkulyarnykh i teplovykh yavleniy.
(Oscillograph) (Electrodes)

SUBJECT: USSR/Physics of Magnetic Phenomena   48-6-12/23

AUTHORS: Al'tshuler, S.A., Zaripov, M.M. and Shekun, L.Ya.

TITLE: Resonance Paramagnetic Absorption of Ultrasound in Some Salts
               of Rare Earth Elements (.lezonansnoye paramagnitnoye pogloshchen-
               iye ul'trazvuka v nekotorykh solyakh redkozemel'nykh elementov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21,
               # 6, pp 844-848 (USSR)

ABSTRACT: The magnitude of the acoustic paramagnetic resonance effect can
               be estimated by the formula:

$$\sigma = \frac{4\pi^2 N \gamma^2}{\rho \gamma_{\frac{1}{2}} v^3 KT} \left(F_{\alpha\beta} \right)^2$$

               where ρ - is the density of a paramagnetic materials,
                     T - is its temperature,
                     v - is the velocity of sound propagation in it,
                     N - is the number of magnetic particles in the unit of
                         volume,
                     $\gamma_{\frac{1}{2}}$ - is the half-width of an absorption line,
                     γ - is the ultrasonic frequency,
Card 1/3 $F_{\alpha\beta}$ - is the matrix element of an operator calculated by

48-6-12/23

TITLE:

Resonance Paramagnetic Absorption of Ultrasound in Some Salts
of Rare Earth Elements (Rezonansnoye paramagnitnoye pogloshchen-
iye ul'trazvuka v nekotorykh solyakh redkozemel'nykh elementov)

the formula

$$\widetilde{\mathcal{J}_{\alpha\beta}} = \sum \gamma^2 \left(\frac{\partial \mathcal{U}}{\partial x}\right)_{\alpha\beta}$$

where U - is the interaction energy with a neighboring partic-
le of the magnetic atom under consideration
        r - is the separation between the given particles, and
        x - is the r-projection on the direction of sound propa-
            gation.
Ultrasonic absorption coefficients for longitudinal waves were
calculated by the above formulae for Pr^{3+}, Eu^{3+}, Tb^{3+}, Ho^{3+} and
Tm^{3+}, and it was established that the maximum absorption must
occur in europium in an excited state.

The phenomenon of paramagnetic resonance absorption, caused by
transitions between sub-levels of hyperfine structure, will be
intermediate in its magnitude between the phenomena of electro-
nic and nuclear paramagnetic resonance.

Frequencies of the order of 10^7 cycles can be used for the ex-
perimental discovery of the absorption effect, if ultrasound is

Card 2/3

TITLE:

Resonance Paramagnetic Absorption of Ultrasound in Some Salts
of Rare Earth Elements (Rezonansnoye paramagnitnoye pogloshchen-
iye ul'trazvuka v nekotorykh solyakh redkozemel'nykh elementov)
absorbed due to transitions between hyperfine structure com-
ponents.

48-6-12/23

The article contains 3 figures, and 1 table.
There are 7 references, 4 of which are Russian.

ASSOCIATION: Kazan' State University imeni Ul'yanov-Lenin

PRESENTED BY:

SUBMITTED: No date indicated.

AVAILABLE: At the Library of Congress.

Card 3/3

AUTHORS: Imamutdinov, F. S., Neprimerov, N. N., Shekun, L. Ya.

56-34-4-45/60

TITLE: The Magnetic Double Refraction of Microwaves in Paramagnetics
             (Magnitnoye dvoynoye lucheprelomleniye mikrovoln v paramag-
             netikakh)

PERIODICAL: Zhurnal eksperimentalnoy i teoreticheskoy fiziki, 1958,
             Vol. 34, Nr 4, pp. 1019 - 1023 (USSR)

ABSTRACT: At the frequency of 9375 megacycles the authors investigated
             the rotation of the polarization plane of the wave H_{11} in
             a circular wave guide filled with paramagnetic salt as func-
             tion of the field strength of the external magnetic field H
             which was arranged vertical to the direction of the propa-
             gation of the radio wave. The gradual transition of a rect-
             angular standard wave guide to a circular waveguide of a
             diameter of 23 mm served as polarizer. A rotating Turnikett-
             link served as analyzer. The angle of rotation does not de-
             pend on the sign of H but on the angle ψ between H and the
             magnetic field H of the radio wave prior to its entering the
             paramagnetic. This dependence obeys the law $\Delta\psi \sim \sin 2\psi$, so
             that the maximum effect is observed at $\psi = 45°$. A diagram

Card 1/2

The Magnet Double Refraction f Microwaves in Paramagnet s   56-34-4-45/6

shows as an example the curve of the specific rotation of a
powdery sample of MnC...4H$_2$O. This rule may be explained as
follows: The rotation if the polarization plane is dependent
on the anisotropy of the magnetic permeability. A formula is
written down for the tensor of the magnetic high frequency
susceptibility of the paramagnetic. The calculation is car-
ried out for the free space and the discussed considerations
show the following: The magnetic double refraction of micro-
waves in paramagnetics (Kotton-Mutton effect for microwaves)
depends in a high degree on the paramagnetic absorption in
vertical and parallel fields. A more accurate description of
the results obtained will follow in a work to follow. There
are figures and   references 6 of which are Soviet.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet
                (Kazan State University)

SUBMITTED: January   , 1958

                1. Microwaves--Refraction   2. Microwaves--Magnetic factors

Card 2/2

S/058/61/000/011/008/025
A058/A101

5.5450

AUTHORS: Imamutdinov, F.I., Shekun, L.Ya.

TITLE: Fine structure of paramagnetic resonance rotation

PERIODICAL: Referativnyy zhurnal. Fizika, no. 11, 1961, 130, abstract 11V261 (V
sb. "Paramagnitn. rezonans", Kazan', Kazansk. un-t, 1960, 153)

TEXT: The authors examine theoretically the effect of internal electric
fields on paramagnetic resonance rotation. It is shown that the rotation curve
must have a fine structure analogous to that of paramagnetic resonance absorption.
Rotation corresponding to individual lines of the fine structure may have differ-
ent signs as a function of the character of the change in energy with the magnetic
field. The fine structure of rotation was observed in corundum single crystals
with Cr^{3+} ions.

[Abstracter's note: Complete translation]

Card 1/1

BIL'DYUKEVICH, A.L.;   VINOKUROV, V.M.;   ZARIPOV, M.M.;   POL'SKIY, Yu.Ye.;
STEPANOV, V.G.;   CHIRKIN, G.K.;   SHEKUN, L.Ya.

Electron paramagnetic resonance in andalusite.   Zhur. eksp. i
teor. fiz. 39 no. 6:1548-1551 D '60.   (MIRA 14:1)

1. Kazanskiy gosudarstvennyy universitet.
            (Paramagentic resonance and relaxation)
                        (Andalusite)

AUTHORS: Vinokurov, V. M., Zaripov, M. M., Stepanov, V. G., Pil'skiy,
              Yu. Yu., Chirkin, G. K., and Shekun, L. Ya.

TITLE: Electron paramagnetic resonance in natural chrysoberyl

PERIODICAL: Fizika tvurdogo tela,   v. 3, no. 8, 1961, 2475 - 2479

TEXT: The electron paramagnetic resonance spectrum of the Fe^{3+} ions which
substituted isomorphically the Al^{3+} ions in Al_2BeO_4 was investigated.
Measurements were made of triple, double, and single crystals at room
temperature, at, $(7 - 51) \cdot 10^9$ cps, and in magnetic fields of up to 20 kilo-
gauss. Nuclear resonance of hydrogen, deuterium, and lithium was used to
measure the field strength. The single crystals were placed in a cylindrical
H_{111} resonator, and their natural faces (100) on its bottom. It could be
changed by an angle of $360°$ in that plane. For studying the angular
dependence of the e.p.r. spectrum between $10 \cdot 10^9$ and $20 \cdot 10^9$ cps a H_{011}
Card 1/4

Electron paramagnetic resonance...

S/181/61/003/006/029/034
B111/~102

resonator was used. The crystal in it could rotate around an axis perpendicular to the resonator's axis. The magnet rotated together with it by 360°. The measurements showed that the angular dependence of the o.p.r. spectrum was due to paramagnetic atoms substituting the Al^{3+} ions. The direction c was found to be one of the main directions of the electric field in the crystal acting on the paramagnetic ion. Whilst the existence of four magnetically nonequivalent, pairwise identical complexes was expected from X-ray diffraction studies, investigations of the o.p.r. spectra indicated the existence of only two identical complexes oriented in opposite directions. The orientations of the other two include an angle of about 70°. The authors attempt to explain this divergence by the assumption that the Al^{3+} ions are replaced by Fe^{3+} only in those complexes (II and IV in Fig. 1) in which the Al^{3+} ions are arranged symmetrically around the O^{2-} ions. If one considers only the neighborhood of the substituting Fe^{3+} ions, they seem to be subjected to an almost cubical symmetric electric field. It is, however, shown that the spectrum observed can be described by a Hamiltonian of lower (rhombical) symmetry. This fact is explained by the assumption that the atoms farther

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electron para magnetic resonance...

S/181/61/003/005/029/034
B111/B102

from the Fe^{3+} ions which are arranged in rhombical symmetry have a significant influence upon the crystal field. Only in a few cases Al^{3+} ions in octahedral sites (I and III, Fig. 1) are substituted by Fe^{3+} ions. V. D. Kolo enskiy and V. G. Kuznetsov are thanked for having supplied specimens, D. Kh. Dinmukhametov and R. M. Mineyev for their assistance in calculations, and S. A. Al'tshuler for discussions. There are 3 figures and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-
                Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: April 5, 1961

Card 3/4

27177

$9.2571 (1147, 1159)$

AUTHOR: Shekun, L. Ya.

TITLE: Fine structure of the Faraday microwave effect in paramagnetics

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 9, 1961, 1146 - 1147

TEXT: The author tries to modify the theory of the Faraday effect of
microwaves for cases where the rotation curve has several minima and maxima.
If the imaginary part and the dispersion of ε are neglected, the angle of
the Faraday rotation per centimeter of wave trajectory is given by

$\vartheta = - \frac{2\pi}{c}\omega\varepsilon \operatorname{Re}\delta$, where $\delta = i\chi_{xy}$, χ_{xy} being the respective element of the tensor

of the h-f magnetic susceptibility. The tensor χ is here calculated for a
paramagnetic gas. The author starts from the Hamiltonian $\mathcal{H} = \mathcal{H}^0 - \hat{\mu}\vec{H}(t)$
which holds for each gas atom. Here, $\hat{\mu}$ is the operator of the magnetic
moment of an atom; $\vec{H}(t) = \operatorname{Re}(\vec{H}e^{i\omega t})$ is the magnetic field of the waves.
$\mathcal{H}^0$ contains all interactions independent of time and the interaction with
a constant magnetic field $\vec{H}_0$. According to data obtained by R. Karplus

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27177

Fine structure of the Faraday...

S/057/61/031/009/017/019
B104/B102

and J. Schwinger (Phys. Rev., 73, 1020, 1948), it can be written down:

$$\vec{\mathcal{I}}(t) = \sum_{m,n} \vec{\mu}_{nm}(\vec{\mu}_{mn}\vec{H})e^{i\omega t}\left(1 - \frac{\omega}{\omega-\omega_{mn}+i/\tau}\right)\frac{g_n^o g_m^o}{2\hbar\omega_{mn}} + \text{complex conjugate} \quad (1),$$

where τ is the mean free time, $\hbar\omega_{mn} = E_m^o - E_n^o$, $g_n^o = \exp(-E_n^o/kT)/\sum_m \exp(-E_m^o/kT)$, E_n^o are the eigenvalues of $\hat{\mathcal{X}}^o$. The tensor χ is determined from the relation $\mathcal{X}\vec{\mu}(t) = \text{Re}(\chi\vec{H}e^{i\omega t})$ (2), where $\mathcal{X}$ is the number of atoms per unit volume. Comparing (1) and (2), the author finds:

$$\chi_{\xi\eta} = \mathcal{X}\sum_{m,n}(\mu_\xi)_{mn}(\mu_\eta)_{nm}\left(1 - \frac{\omega}{\omega-\omega_{mn}-i/\tau}\right)\frac{g_n^o g_m^o}{\hbar\omega_{mn}} .$$

This formula solves the problem. The diagonal elements of χ determine the energy absorbed and the change in wavelength, and the off-diagonal elements determine the ellipticity and the Faraday rotation. Some special examples are discussed. The author thanks S. A. Al'tshuler and B. I. Kochelayev for

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27177

S/057/61/031/009/017/019

Fine structure of the Faraday...   B104/B102

valuable discussions. There are 8 references: 3 Soviet and 5 non-Soviet.
The most recent reference to an English-language publication reads as
follows: A. Abragam et al., Proc. Roy. Soc., A205, 135, 1951.

SUBMITTED: February 6, 1961

Card 3/3

VINOKURO'', V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.;
    CHIRKIN, G.K.; SHEKUN, L.Ya.

Studying the ismorphous features of Fe^{3+} ions in andalusite by
the paramagnetic resonance method. Kristallografiia 7 no.2:
318-320 Mr-Ap '62.   (MIRA 15:4)

1. Kazanskiy gosudarstvennyy universitet imeni Ul'yanova-Lenina.
   (Andalusite) (Paramagnetic resonance and relaxation)

VINOKUROV, V.M.; ZARIPOV, M.M.; STEPANOV, V.G.; POL'SKIY, Yu.Ye.; CHIRKIN, G.K.; SHEKUN, L.Ya.

Paramagnetic resonance of trivalent chromium in andalusite. Fiz. tver. tela 4 no.3:646-649 '62.   (MIRA 15:4)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.
   (Paramagnetic resonance and relaxation) (Chromium) (Andalusite)

SHEKUN, L.Ya.

    Theory of oscillographic polarography. Zhur. fiz. khim. 36
    no.3:455-457 Mr '62.   (MIRA 17:8)

    1. Kazanskiy gosudarstvennyy universitet.

VINOKUROV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.;
        CHIRKIN, G.K.; SHEKUN, L.Ya.

        Electron paramagnetic resonance of Gd^{3+} and CaF_2.
        Fiz. tver. tela 4 no.8:2238-2242 Ag '62.   (MIRA 15:11)

        1. Kazanskiy gosudarstvennyy universitet imeni
        V.I. Ul'yanova-Lenina.
                    (Paramagnetic resonance and relaxation)
                            (Gadolinium)
                        (Calcium fluoride)

ARKHANGEL'SKAYA, Ye.D.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.;
    CHIRKIN, G.K.; SHEKUN, L.Ya.

Electron paramagnetic resonance of Cr^{3+} in $K_2Zn(SC_4)_2$. $6H_2O$.
Fiz. tver. tela 4 no.9:2530-2533 S '62.   (MIRA 15:9)

1. Kazanskiy gosudarstvennyy universitet imeni V.I. Ul'yanova-
Lenina.
            (Paramagnetic resonance and relaxation)
                    (Tutton's salts)

VINOKUROV, V.M.; ZARIPOV, M.M.; ___ ____, Iu.Ie.; ___ ____OV, V.G.; CHIRKIN, G.K.;
SHEKUN, L.Ya.

Electron paramagnetic resonance of Gd^{+3} in CaF_2.   Fiz. tver. tela
5 no.2:599-604 F '63.   (MIRA 16:5)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.
    (Paramagnetic resonance and relaxation)   (Gadolinium)
                    (Calcium fluoride)

L 13679-63   EWT(1)/EWP(q)/EWT(m)/BDS/EEC(b)-2   AFFTC/ASD/ESD-3   GG/JD/IJP(C)

ACCESSION NR: AP3003893   S/0181/63/005/007/1936/1939

AUTHOR: Vinokurov, V. M.; Zaripov, M. M.; Stepanov, V. G.; Chirkin, G. K.;   69
Shekun, L. Ya.   67

TITLE: Electron paramagnetic resonance of Eu²⁺ ions in BaF_2 and SrF_2 monocrystals

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1936-1939

TOPIC TAGS: electron paramagnetic resonance, europium-doped fluoride, europium
hyperfine structure, EPR measurement, barium fluoride, strontium fluoride,
calcium fluoride

ABSTRACT: Experiments have been carried out with 0.05% Eu ions in the cubic
symmetry field of BaF_2 and SrF_2 crystals at a frequency of approximately 40 kmc.
In the case of a parallel field, the EPR spectral groups represent the superposition
of two equidistant hyperfine structure sextets. The width of the individual
hyperfine components is a few oersteds, and the sextet centers coincide within 1 oe.
The Hamiltonian constants determined from the measurements are tabulated and
compared with analogous constants found in the literature for CaF_2. The variation
in the hyperfine-structure constants is found to be within the limits of experi-
mental error. In the case of nonparallel magnetic fields, additional lines

Card   1/2

L 13679-63

ACCESSION NR: AP3003893

appeared between the usual hyperfine components, due to the transition $\Delta M = \pm 1$, $\Delta m = \pm 1$. The appearance of additional lines is remarkable, since the fine structure is small in comparison to Zeeman energy. Computation of the intensity of the additional lines shows that even with $H = 1.4 \times 10^4$ oe and a field angle of $\pi/8$ the intensities of the additional and fundamental lines are comparable. "We express our thanks to P. P. Feofilov who directed our attention to these materials and kindly provided specimens for investigation." Orig. art. has: 5 formulas and 1 table.

ASSOCIATION: Kazanskiy gosudarstvenny*y universitet im. V. I. Ul'yanova-Lenina (Kazan State University)

SUBMITTED: 06Mar63   DATE ACQ: 15Aug63   ENCL: 00

SUB CODE: PH   NO REF SOV: 001   OTHER: 003

Card 2/2

VINOKUROV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.; CHIRKIN,
    G.K.; SHEKUN, L.Ya.

Electron paramagnetic resonance of Gd^{3+} in CaF_2. Fiz. tver. tela
5 no.10:2902-2907 O '63.   (MIRA 16:11)

1. Kazanskiy gosudarstvennyy universitet im. V.I. Ul'yanova-
Lenina.

L 13808-63   EWT(1)/EWP(q)/EWT(m)/BDS   AFFTC/ASD   P1-4   GG/IJP(C)/JD/JG

ACCESSION NR: AP3003916   8/0181/63/005/007/2034/2035

AUTHOR: Vinokurov, V. M.; Zaripov, M. M; Stepanov, V. G.; Chirkin, G. K.;
Shekun, L. Ya.

TITLE: Paramagnetic resonance of Nb4+ ions in zircon monocrystals

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 2034-2035

TOPIC TAGS: zircon, zirconium, niobium ion, niobium zircon spectrum, impurity
spectrum, Nb EPR spectrum, niobium zircon EPR

ABSTRACT: A characteristic spectrum of ten lines, equal in intensity and prac-
tically equidistant, has been observed in a $ZrSiO_4$ monocrystal at 77K. Measure-
ments showed that the positions of all ten lines can be described by a spin
Hamiltonian with $S = 1/2$ and $I = 9/2$. The parallel g-factor is 1.862 ± 0.001,
and the perpendicular g-factor is 1.908 ± 0.001. The authors conclude that
these lines are due to the Nb^{4+} ion replacing the Zr ion in the lattice, since
the spin of the Nb^{93} nucleus is 9/2, niobium is present in natural zircon, and
the parameters of the spin Hamiltonian described above are close to those de-
scribing the Nb^{4+} spectrum in glass. Furthermore, Nb^{4+} resembles Ti^{3+} and V^{4+}
in its magnetic properties, and the specific spectral features of the Nb ion in

Card 1/2

AP3003916

zircon are characterized by the low-symmetry of the patterns displayed in the case of Ti and V ions
sit by the action of the low-symmetry electric fields. "We express our sincere gratitude to
N. S. Garif'yanov for evaluating the results of our work." Orig. art. has: 1
formula and 1 figure.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina
(Kazan State University)

SUBMITTED: 18Mar63

SUB CODE: PH   DATE ACQ: 15Aug63

                                NO REF SOV: 005   ENCL: 00

                                                                    OTHER: 004

Card   2/2

ACC NR: ...

AUTHOR: ...

ORG: ...

TITLE: Electron paramagnetic resonance in crystals

SOURCE: Paramagnitnyy rezonans (Paramagnetic resonance); sbornik statey. Kazan, Izd-vo Kazanskogo univ., 1964, 5-41

TOPIC TAGS: electron paramagnetic resonance, Hamiltonian, EPR spectrum, ion

ABSTRACT: Ordinary spin Hamiltonians are used for describing electron paramagnetic resonance spectra in crystals. Expressions are given for the operators which describe the fine structure of the spectra for various types of electric field symmetry: cubic, hexagonal, trigonal, tetragonal, rhombic and purely axial. The procedures used for absorption line identification to find the constants of the spin Hamiltonian are discussed. Expressions are given for calculating the hyperfine structure due to interaction between the electron magnetic moment and the magnetic moment of the nucleus of the paramagnetic atom. Experimental research done at the Kazan University on electron paramagnetic resonance spectra in crystals is briefly reviewed. The data on ions with identical effective spins are grouped together. Ions with spins of 1/2, 3/2, 5/2 and 7/2 are considered. Orig. art. has: 25 figures, 30 tables, 30 formulas.

SUB CODE: 20/   SUBM DATE: 04Jun64/   ORIG REF: 014/   OTH REF: 017

Card 1/1

L 41669-65   EEC(b)-2/EPF(c)/EPF(n)-2/EPR/EWA(k)/EWA(c)/EWT(l)/EWT(m)/EWP(b)/T/EWP(t)
Ƭ-4/Ps-4/Pu-4   IJP(c)   RB/JD/JG
ACCESSION NR: AP4034930   S/0181/64/006/005/1462/1464

AUTHORS: Kurkin, I. N.; Shekun, L. Ya.

TITLE: Paramagnetic resonance of trivalent neodymium in a single crystal of PbMoO4

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1462-1464

TOPIC TAGS: magnetic resonance, single crystal, tetragonal system, Kramers doublet, hyperfine structure

ABSTRACT: The authors have investigated synthetic single crystals of PbMoO4 containing about 0.5% neodymium. An intense electron paramagnetic spectrum was observed at 4K. The spectrum is characteristic of the Nd^{3+} ion. The position of the lines is described by a spin Hamiltonian with an effective spin S = 1/2. This indicates that at this low temperature only one of the five Kramers doublets that develop after the action of the tetragonal field on the J = 9/2 level is present. Both odd isotopes of Nd--Nd^{143} (12%) and Nd^{145} (8%)--have a nuclear spin of I = 7/2 and yield two octets of hyperfine structure accompanying the intense peaks of the even isotopes. It is not yet possible to make a final determination

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L 41669-65
ACCESSION NR: AP4034930

of the form of the wave function for the principal doublet. The spin Hamiltonian
constants have been determined. A proper choice of constants can apparently be
made only when the positions of the remaining four doublets are known. "We wish
to thank P. P. Feofilov, who kindly supplied samples of neodymium-bearing PbMoO$_4$,
and also V. G. Stepanov, G. K. Chirkin, and Ye. I. Kirillov for their considerable
aid in the work." Orig. art. has: 1 figure, 1 table, and 9 formulas.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina
(Kazan State University)

SUBMITTED: 06Dec63   ENCL: 00   SUB CODE: SS

NO REF SOV: 001   OTHER: 001

Card 2/2

TITLE: Investigation of paramagnetic resonance of Gd+++ in artificial lead molybdate

ABSTRACT: Continuing earlier research on the EPR of rare-earth ions imbedded in single crystals with the structure of $CaWO_3$, the authors measured the EPR spectra of Gd^{3+} in the artificial single crystal $PbMoO_4$ with the hope that comparison of the spectra of the impurity ions in two similar lattices, $CaWO_4$ and $PbMoO_4$, will help determine the locations of the energy levels of these ions. The measurements

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ACCESSION NR: AP4041695

were made at room temperature with the magnetic field parallel to the
c axis and frequencies ~10 and ~36 Gc/sec. Although the signs of
the obtained spin-Hamiltonian constants for both lattices agree, the
results are still inconclusive. "We are grateful to P. P. Feofilov
for the lead-molybdate single crystals and to V. G. Stepanov and V. M.
Vinokurov for great help." Orig. art. has: 2 figures, 1 formula, and
1 table.

ASSOCIATION: Kazanskiy gosudarstvenny*y universitet im. V. I.
Ul'yanova-Lenina (Kazan' State University)

SUBMITTED: 14Jan64   :   ENCL: 01

SUB CODE: NP, SS   NR. REF SOV: 003   OTHER: 004

Card   2/3

ACCESSION NR: AP4041695

ENCLOSURE: 01

	$g_\parallel$	$g_\perp$	$a \cdot 10^4$	$b \cdot 10^4$	$c \cdot 10^4$	$d \cdot 10^4$	$e \cdot 10^4$	Темпе-ратура, °K	Литературная ссылка
					см^{-1}				
$CaMoO_4$	1.9915 ± 0.0004	1.9916 ± 0.0004	-916.7 ± 1	-24.0 ± 0.2	-0.6 ± 0.3	-145.1 ± 1	0.0 ± 0.3	77	
$PbMoO_4$	1.992 ± 0.001	1.992 ± 0.001	-800 ± 2	-12.00 ± 2.0	-0.0 ± 2.0	-91.0 ± 10	0.0 ± 10	290	[²] Настоящая работа This work

Card 3/3

ACCESSION NR: AP4041701   S/0181/64/006/007/2014/2016

AUTHORS: Antipin, A. A.; Kurkin, I. N.; Chirkin, G. K.; Shekun, L. Ya.

TITLE: Electron paramagnetic resonance of Ce^{+++} ions interpenetrated in single crystals of SrF_2 and BaF_2

SOURCE: Fizika tverdogo tela, v. 6, no. 7, 1964, 2014-2016

TOPIC TAGS: electron paramagnetic resonance, single crystal, spectral analysis, barium compound, strontium compound, tetragonal system, cerium

ABSTRACT: To provide a comparison with results obtained by optical tests, the authors investigated the EPR of SrF_2 and BaF_2 single crystals containing about 0.5% Ce^{3+}, at 4.2K and a frequency close to 9 Gc/sec. In view of the closeness of the results to those obtained by Baker et al. for CaF_2 (Proc. Phys. Soc. v. 73, 942, 1959),

Card   1/3

ACCESSION NR: AP4041701

it is concluded that spectral characteristics of magnetic centers
with tetragonal symmetry were observed for both host substances.
Satellite lines analogous to those observed in CaF_2 were observed.

The g-factors were determined by using the position of the DPPH
line at liquid helium temperature. The values obtained for CaF_2,
SrF_2, and BaF_2 were 0.834, 0.829, and 0.825, respectively. It is
suggested that the g-factor of the free ion is closer to 0.825
than to the ideal Russel-Saunders value $6/7 = 0.856$. The reason
for this is that the crystal field adds states with $J = 5/7$ to the
ground state $J = 5/2$. "In conclusion we thank P. P. Feofilov for
supplying the cerium activated SrF_2 and BaF_2." Orig. art. has:
7 formulas.

ASSOCIATION: Kazanskiy gosudarstvenny*y universitet im. V. I.
Ul'yanova-Lenina (Kazan' State University)

Card   2/3

L 63617-65   EWT(1)/EWT(m)/EPF(c)/T/EWP(t)/EWP(b)/EWA(c)   P1-4   IJP(c)   JD/WH/JG/GG

ACCESSION NR: AP5016920   UR/0192/65/006/003/0464/0465   33
                                           538.113   32
                                                                           B

AUTHOR: Kurkin, I. N.; Potkin, L. I.; Samoylovich, M. I.; Shekun, L. Ya.

TITLE: Electron spin resonance of neodymium in scheelite calcium molybdate structures

SOURCE: Zhurnal strukturnoy khimii, v. 6, no. 3, 1965, 464-465

TOPIC TAGS: neodymium, powellite, scheelite, electron spin resonance, ESR spectrum, calcium molybdate, Stark effect

ABSTRACT: ESR spectra of neodymium incorporated in single crystals of artificial $CaMoO_4$ (powellite) were recorded at 4.2K at a frequency of about 10 KMc. The angular dependence of the spectrum showed that all Nd^{3+} ions are magnetically equivalent. The neodymium content of $CaMoO_4$ crystals was approximately two orders of magnitude less than its amount in the initial mixture. The line width was about 3 Oe. No paramagnetic impurities other than Nd^{3+} were found. The position of the ESR lines of Nd^{3+} is described by the usual axial spin Hamiltonian, whose constants are tabulated with corresponding values for $CaWO_4$ and $PbMoO_4$. When Pb is substituted for Ca, the anionic MoO_4 groups being the same, the g tensor undergoes a considerable change (due to the change in g_{11}). Conversely, the substitution of MoO_4 for WO_4, the divalent cation

Card 1/2

L 63617-65

ACCESSION NR: AP5016920

being the same, causes very little change in the g tensor. It is concluded that the para-
magnetic centers studied were formed as a result of the substitution of neodymium for Ca
and Pb ions. The authors express the hope that a systematization of the ESR data on im-
purity ions in scheelites will aid in the formulation of a theory for the crystalline Stark
effect in these structures. Orig. art. has: 1 table.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet (Kazan State University)

SUBMITTED: 28Oct64   ENCL: 00   SUB CODE: SS, NP

NO REF SOV: 003   OTHER: 002

Card 2/2

L 45209-65   EPF(c)/EWT(1)/EEC(t)   P1-4   IJP(c)   GG/WW
ACCESSION NR: AP5006919   s/0181/65/007/003/0938/0939

AUTHOR: Antipin, A. A.; Kurkin, I. N.; Shekun, L. Ya.

TITLE: Electron paramagnetic resonance of Yb^{3+} ions in hexagonal ZnS

SOURCE: Fizika tverdogo tela, v. 7, no. 3, 1965, 938-939

TOPIC TAGS: electron paramagnetic resonance, zinc sulfide, rare earth ion, ytterbium, g factor, spin Hamiltonian

ABSTRACT: The authors report results obtained using zinc sulfide, which has a wurtzite structure, as a matrix for the rare-earth ion Yb^{3+}. The crystals were obtained from a melt containing 0.5% Yb. The EPR spectral characteristics of Yb^{3+} were observed at 4.2K in all the samples. Comparison with EPR spectra from other compounds indicated that the actual concentration of the Yb^{3+} ions was much lower than 0.5% (by approximately two orders of magnitude). The EPR lines showed distortion, evidencing a block structure. The g-factors for the spin Hamiltonian are found to be 1.242 ± 0.005 and 4.400 ± 0.015 for the parallel and perpendicular factors, respectively. A symmetry study shows that there are two variants of wave functions capable of giving the observed g-factor, and it is thus concluded that

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L 45209-65

ACCESSION NR: AP5006919

the ground state can be regarded with sufficiently good approximation as being the doublet ± 1/2. "The authors are deeply grateful to V. N. Tkachuk for preparing the ZnS·Yb crystals and also to P. P. Feofilov and A. I. Ryskin for interest in the work." Orig. art. has: 6 formulas.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan' State University)

SUBMITTED: 22Oct64   INCL: 00   SUB CODE: SS, NP

NR REF SOV: 000   OTHER: 002

Card 2/2

L 51403-65   EWG(j)/EWT(l)/EWT(m)/EPF(c)/EPF(n)-2/EPR/T/EWP(t)/EEC(b)-2/
EWP(b)/EWA(c)   Pr-4/Ps-4/Pi-4/Pu-4   IJP(c)   JD/JG/GG
ACCESSION NR: AP5010699   UR/0181/65/007/004/0985/0988

AUTHOR: Antipin, A. A.; Kurkin, I. N.; Stepanov, V. G.; Shekun, L. Ya.

TITLE: Paramagnetic resonance of terbium in single crystals of $PbMoO_4$

SOURCE: Fizika tverdogo tela, v. 7, no. 4, 1965, 985-988

TOPIC TAGS: electron paramagnetic resonance, terbium, lead molybdate, spin
Hamiltonian

ABSTRACT: In view of recent observation of EPR resonance of Tb^{3+} in artificial
scheelite, the authors investigated the EPR of terbium in $PbMoO_4$ which has a sim-
ilar structure. A single-crystal sample with volume 40 mm^3 was separated from a
pellet drawn from a melt, and contained about 0.5% Tb. EPR of Tb^{3+} ions was ob-
served at 4.2K. All the ions were magnetically equivalent. The experiments were
made at wavelengths 3 cm and 8 mm. A microwave cavity was used which made it pos-
sible to rotate the sample about a horizontal axis without removing it from the
helium bath. The 8 mm resonator was such that at helium temperatures the distance
between the pole pieces could be decreased to 45 mm. No effect attributable to
terbium could be detected at 10 and 12 Gcs in fields up to 7 kG. A intense spec-

Card 1/2

L 51403-65
ACCESSION NR: AP5010699

trum of four equidistant lines, which undcub;;edly belong to Tb^{3+} $(4f^8, {}^7F_6)$ could be observed at ~36 and 46 Gcs. The constants of the effective Hamiltonian describing the line positions were determined, the longitudinal g-value being 17.8 ± ± 0.2. It is shown that the EPR is observed between singlets levels, where irreducible representations and wave-function forms are determined. The conditions under which the singlets are close to each other are found and an approximate formula is derived for the distance between them. "In conclusion we thank A. M. Morozov for preparing the crystals, A. M. Leushin for fruitful discussions, and P. P. Feofilov for continuous interest." Orig. art. has: 3 figures and 14 formulas.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova (Lenina) (Kazan' State University)

SUBMITTED: 28Jul64   ENCL: 00   SUB CODE: SS, MP

NR REF SOV: 002   OTHER: 006

Card 2/2

L 51967-65   EWT(1)/EWT(m)/EEC(k)-2/EEC(t)/T/EWP(t)/EWP(b)/EWA(c)   Pi-4
IJP(c)   JD/WW/JG/GG

ACCESSION NR: AP5012553   UR/0181/65/007/005/1425/1427

AUTHOR: Antipin, A. A.; Katyshev, A. N.; Kurkin, I. N.; Shekun, L. Ya.

TITLE: Investigation of paramagnetic resonance of erbium and europium in arti-
ficial lead molybdate single crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 1425-1427

TOPIC TAGS: electron paramagnetic resonance, erbium, europium, g factor, hyper-
fine structure, lead molybdate, rare earth oxide, EPR

ABSTRACT: The measurements were made on single-crystal $PbMoO_4$:Er and $PbMoO_4$:Eu
grown by drawing from a melt containing $\sim 0.5\%$ of the rare earth in oxide form.
The EPR spectrum of erbium, observed at 4.2K, consisted of a strong central line
accompanied by 8 weaker hyperfine structure lines. The spin Hamiltonian is deter-
mined from the angular dependence of the spectrum; the   constants are determined,
using a procedure described earlier (FTT v. 6, 1462, 1964), from measurements at
~ 3 and ~ 10 cm wavelengths. Values of 1.195 ± 0.005 and 8.45 ± 0.05 are obtained
for the parallel and the perpendicular g-factor, respectively, and are in good
agreement with the theoretical values 1.2 and 9.6. In the case of europium, a

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L 51967-65

ACCESSION NR: AP5012553

spectrum is observed already at room temperature, consisting of groups that constitute two hyperfine sextets each. Such a spectrum is characteristic of a Eu^{2+} ($4f^7$, $^8S_{7/2}$). Measurements at ~ 36 Gcs and at 77K yielded a value 1.992 ± ± 0.001 for both perpendicular and parallel g-factor. Comparison with the results for Gd^{3+} confirms that the splitting of the ^8S term for Gd^{3+} is much larger than for Eu^{2+}, as was apparently observed for all other crystals. "The authors are sincerely grateful to A. M. Morozov for furnishing the samples, P. P. Feofilov for continuous interest, and G. K. Chirkin for great help with the work." Orig. art. has: 2 formulas.   [02]

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan' State University)

SUBMITTED: 04Dec64   ENCL: 00   SUB CODE: NP, IC

NO REF SOV: 005   OTHER: 001   ATD PRESS: 4009

me

Card 2/2

L 51968-65   EWT(1)/EWT(m)/EPF(c)/EEC(t)/EWP(t)/EWP(b)   Pi-4   IJP(c)
JD/WW/JG/GG

ACCESSION NR: AP5012586   UR/0181/65/007/005/1575/1577

AUTHOR: Antipin, A. A.; Kurkin, I. N.; Livanova, L. D.; Potvorova, L. S.; Shekun,
L. Ya.

TITLE: Paramagnetic resonance[2] of trivalent samarium in single-crystal CaF_2

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 1575-1577

TOPIC TAGS: paramagnetic resonance, trivalent samarium,[2] electron paramagnetic
resonance, paramagnetic center, g factor, hyperfine structure

ABSTRACT: In view of the fact that the EPR spectrum observed in samples of
CaF_2:Sm prepared in the authors' laboratory differ greatly from that observed by
others, a thorough study was made of these spectra. The samples were grown by the
Bridgman method in an induction furnace using a graphite crucible. One sample was
grown in a reducing medium and the other in an oxidizing medium. The spectra of
both samples were the same, differing only in intensity. The angular dependence
of the spectra corresponded to a tetragonal symmetry of the centers. A pronounced
hyperfine structure was observed at wavelength ~ 3 cm. The values obtained for
the parallel and perpendicular g-factors were 0.00 ± 0.06 and 0.823 ± 0.003, re-

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L 51968-65
ACCESSION NR: AP5012586

spectively. These values, as well as the calculated values of the resonant field
for Sm^{3+} at 9293 Mc , are in excellent agreement with the theoretical calculations.
The results leave no doubt that tetragonal centers of Sm^{3+} can be produced in the
system CaF_2:Sm and that their magnetic properties differ strongly from those ob-
tained by Weber and Bierig (Phys. Rev. v. 134A, 1492, 1964) and by Low (Phys. Rev.
v. 134A, 1479, 1964), whose results call for additional investigations. Orig. art
has: 1 figure, 2 formulas, and 1 table.   [02]

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina
(Kazan' State University)

SUBMITTED: 25Dec64   INCL: 00   SUB CODE: SS, NP

NO REF SOV: 002   OTHER: 008   ATD PRESS: 4009

Card 2/2

L 61661-65   EWT(1)/T/EEC(b)-2   Pi-4   IJP(c)   GG
ACCESSION NR: AP5011140   UR/0051/65/018/004/0738/0740
                                         535.34 : 538.11 3

AUTHORS: Kurkin, I. N.;   Shekun, L. Ya.

TITLE: Electron paramagnetic resonance spectrum of Yb^{3+}
ions in synthetic $PbMoO_4$ single crystals

SOURCE: Optika i spektroskopiya, v. 18, no. 4, 1965, 738-740

TOPIC TAGS: electron paramagnetic resonance, epr spectrum, lead
molybdate, ytterbium ion, spin Hamiltonian

ABSTRACT: The studied single crystals of lead molybdate contain-
ing ytterbium were grown by drawing from the melt and contained
about 0.5 per cent Yb.   There was no paramagnetic resonance in
these crystals at room and liquid-nitrogen temperatures, but an
intense spectrum was observed at 4.2K and assigned with certainty
to the $Yb^{3+}(4f^{13}, {}^2F_{7/2})$ ion. Investigation of the angular de-
pendence showed that all the Yb^{3+} ions are magnetically equivalent.

Card   1/2

L 61661-65

ACCESSION NR: AP5011140

A spin Hamiltonian is written for the spectrum, with an effective spin $S = 1/2$. The parallel and perpendicular g factors are found to be 0.663 ± 0.004 and 3.86 ± 0.02, respectively. The coefficients of the spin Hamiltonian are also evaluated, and the extent to which the state $^2F_{5/2}$ is intermixed with the ground state $^2F_{7/2}$ is estimated. It is concluded that the mixing of the states is not large. The results are discussed from the point of view of the position occupied by the ytterbium ions in the $PbMoO_4$ crystal lattice. 'We thank P. P. Feofilov for interest in the work, A. M. Morozov for preparing the crystals and for providing the samples for the investigation, and S. A. Al'tshuler and A. M. Leushin for helpful discussions.' Original article has: 2 figures and 15 formulas

ASSOCIATION: None

SUBMITTED: 28Sep64   ENCL: 00   SUB CODE: OP, NP

NR REF SOV: 002   OTHER: 005

Card   2/2

L 50524-65   EWT(1)/EWT(m)/EPF(c)/EEC(t)/T/EWP(t)/EWP(b)/EWA(c)   Pi-4
IJP(c)   JD/JG/GG/WW

ACCESSION NR: AP5010157   UR/0020/65/161/002/0322/0323

39

AUTHOR: Kurkin, I. N.; Morozov, A. M.; Shekun, L. Ya.   *37*

TITLE: Paramagnetic resonance of cerium in single-crystal $PbMoO_4$ *B*

SOURCE: AN SSSR. Doklady, v. 161, no. 2, 1965, 322-323

TOPIC TAGS: electron paramagnetic resonance, cerium, lead molybdate, single crystal, rare earth element

ABSTRACT: Results are presented of an investigation of electron paramagnetic resonance of the simplest of the rare-earth ions (Ce^{3+}, $4f^1$, $^2F_{1/2}$) in a single crystal of $PbMoO_4$ (scheelite structure). The measurements were made with a sample drawn from a melt and containing nominally 0.3 mol.% of Ce^{3+} and Yb^{3+} each, introduced into the melt in the form of CeO_2 and Yb_2O_3. The excess charge was compensated with a suitable amount of Na_2MoO_4. In spite of the fact that the sample was far from perfect, the magnetic resonance of Ce^{3+} and Yb^{3+} was reliably observed at 4.2K, one intense line belonging to Ce^{3+}, indicating that only one of the doublets is populated at 4.2K. The parallel and perpendicular g-factors were found to be

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L 50524-65

2

ACCESSION NR: AP5010157

2.684± 0.005 and 1.514 ± 0.015, respectively. This is within 4% of the values obtained if it is assumed that the wave function of the principal doublet is transformed in accordance with the irreducible representation Γ_{t7}. Certain data derived on the quality of the investigated crystals and on the character of their imperfections, based on the EPR results, are summarized. "The authors thank P. P. Feofilov for interest in the work." This report was presented by Ye. K. Zavoyskiy. Orig. art. has: 4 formulas.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan' State University)

SUBMITTED: 05Oct64   ENCL: 00   SUB CODE: SS, NP

NR REF SOV: 000   OTHER: 002

ml

Card 2/2

L 11896-66

AUTHOR: Shekun, L. Ya.

ORG: Kazan' State University (Kazanskiy gosudarstvennyy universitet)

TITLE: Parameters of crystalline field of tetragonal centers with scheelite structure

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 9, 1965, 437-438

TOPIC TAGS: crystal lattice parameter, calcium compound, tungstate, otpic spectrum, EPR spectrum

ABSTRACT: Analyzing the optical spectra and the EPR of the centers formed in crystals of the homological scheelite series ($CaWO_4$) by the rare-earth ions, the author found that the effect of the crystalline field on the trivalent rare-earth ion can be described by a potential

$$V = B_2^0 V_2^0 + B_4^0 V_4^0 + B_6^0 V_6^0 + B_4^4 V_4^4 + B_6^4 V_6^4 , \qquad (1)$$

where $B_n^m = A_n^m \langle r^n \rangle$ and V_n^m are dimensionless harmonic polynomials. Estimates of the order of magnitude of the B_n^m yields

$$B_2^0 = +260 \text{ cm}^{-1}, \qquad B_4^0 = -75 \text{ cm}^{-1}, \qquad B_6^0 = 0,$$

$$B_4^4 = -800 \text{ cm}^{-1}, \qquad B_6^4 = -380 \text{ cm}^{-1}, \qquad (2)$$

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L 11896-66

ACC NR: AP6000743

which duplicates, within $\pm 10^{-1}$, the Stark structure of Yb^{3+} in $CaWO_4$ (R. Pappalardo and D. L. Wood, J. Molec. Spectr. v. 10, 81, 1963), and within ± 20 cm^{-1} the structure of the levels $^4I_{9/2}$ and $^4I_{11/2,13/2}$ of Nd^{3+} in $PbMoO_4$ (Ya. E. Kariss and P. P. Feofilov, Optika i spektroskopiya v. 17, 718, 1964). Without changing the constants (2), it is possible to obtain, with 15% accuracy, the g-factors of the principal doublets of Ce^{3+}, Nd^{3+}, Sm^{3+}, Tb^{3+}, and Yb^{3+} in $CaWO_4$. For large J the agreement with experiment is poorer. The potential (1) can be subdivided into pure-cubic, and axial parts (table). The resuls show that the principal role is played in the potential by the cubic part. This fact can be used for rough calculations. A detailed justification of the conclusions will be published soon. Orig. art. has: 2 formulas and 1 table.

	B_2^0	B_4^0	B_6^0	B_4^4	B_6^4
Cubic	0	-160	+18	-800	-380
Axial	+260	+85	-18	0	0
Sum	+260	-75	0	-800	-380

SUB CODE: 20/   SUBM DATE: 10Sep65/   ORIG REF: 002/   OTH REF: 005

HW

Card 2/2

AUTHOR: Kurkin, I. N.; Shekun, L. Ya.

ORG: Kazan State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: Comparison of electron paramagnetic resonance of Nd^{3+} and Ce^{3+} ions in two crystals of the homologous scheelite series

TOPIC TAGS: calcium compound, strontium compound, tungstate, EPR, neodymium, cerium, crystal lattice structure

ABSTRACT: The authors study the paramagnetic properties of trivalent neodymium and cerium impurity ions in the tungstates of strontium and calcium. The measurements were made at $4.2°K$ and a frequency of 10 Gc. The electron paramagnetic resonance spectra indicate that the overwhelming majority of the lanthanon ions are magnetically equivalent and are located in a uniaxial (apparently tetragonal) crystal field. The spectral parameters for the impurity ions are tabulated. A comparison of the results with previously published data shows that the tetragonal centers of the Nd^{3+} and Ce^{3+} ions in $CaWO_4$ are faithfully reproduced in spite of wide differences in the

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L 9248-66

ACC NR: AP5022739

6

conditions under which the crystals were grown. A transition from $CaWO_4$ to $SrWO_4$ causes only a slight change in the g-tensor of the same ion, so that all spectral data may be referred to centers of the same type. Anisotropy in the g-factor for trivalent neodymium increases with a transition from calcium to strontium tungstate. The reverse is true for the Ce^{3+} g-tensor. The authors are grateful to A. M. Moro- zov for preparing the specimens, and to P. P. Feofilov for his constant interest in the work. Orig. art. has: 2 tables, 1 formula.

SUB CODE: 07,20/   SUBM DATE: 03Apr65/   ORIG REF: 003/   OTH REF: 003

Card 2/2

L 10570-66   EWT(1)/EWT(m)/EWP(t)/EWP(b)   LJP(c)   JD/WW/JG/GG
ACC NR: AP5025394   SOURCE CODE: UR/0181/65/007/010/3105/3106

AUTHOR: Antipin, A. A.; Kurkin, I. N.; Potkin, L. I.; Samoylovich, M. I.; Shekun,
L. Ya.

ORG: Kazan State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy
universitet)

TITLE: Electron paramagnetic resonance of trivalent neodymium in barium tungstate

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 3105-3106

TOPIC TAGS: neodymium, barium compound, tungstate, EPR spectrum, crystal, magnetic
anisotropy

ABSTRACT: The authors studied electron paramagnetic resonance in $BaWO_4:Nd^{3+}$ speci-
mens containing 0.05% neodymium. The crystals were grown from a molten salt solu-
tion. The spectral lines for the trivalent lanthanon ion in these crystals are
given for orientations of $\theta = 0°$, where θ is the angle between the magnetic field
and crystal axis c. A comparison of these experimental data with theoretically
calculated resonance fields shows a divergence of no more than 15 oersteds. Data

Card 1/2

L 10570-66

ACC NR: AP5025394

from electron paramagnetic resonance measurements of trivalent neodymium in $CaWO_4$, $PbMoO_4$ and $BaWO_4$ lattices indicate magnetic centers of a single type. However, the degree of change in anisotropy is much greater in barium tungstate than that observed for the same ion in the homologous fluorite series. Orig. art. has: 1 figure.

SUB CODE: 07,20/ SUBM DATE: 26Apr65/ ORIG REF: 002/ OTH REF: 003

Card 2/2

L 9579-66   EWT(1)/EWP(e)/EWT(m)/ETC/EWG(m)/EWP(t)/EWP(b)   IJP(c)   RDW/JD/WW/
ACC NR: AP5027395   GG/WH   SOURCE CODE: UR/0181/65/007/011/3209/3212

AUTHOR: Antipin, A. A.; Kurkin, I. N.; Potvorova, L. Z.; Shekun, L. Ya.   70

ORG: Kazan' State University im. V. I. Ul'yanov-lenin (Kazanskiy gosudarstvennyy universitet)   B

TITLE: Investigation of tetragonal centers of trivalent samarium ions in rutile single crystal by means of EPR

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3209-3212

TOPIC TAGS: single crystal, crystal property, samarium, EPR spectrum, EPR spectrometry, rutile

ABSTRACT: The authors observed the electron paramagnetic resonance of ions of Sm^{3+} ($4f5$, $^6H_{5/2}$) in $CaWO_4$ single crystals. The samples were grown by the Czochralski method for a melt containing 0.5% Sm and a corresponding amount of Na_2WO_4 (to compensate for the excess charge). All the Sm^{3+} ions were magnetic-equivalent. A study of the EPR spectrum of the $CaWO_4$:Sm:Nd specimen indicates that the major axes of the magnetic centers of Sm^{3+} and Nd^{3+} coincide, which leads to the conclusion that both centers are identical in nature. The results are discussed from the theoretical viewpoint. "In conclusion the authors express sincere gratitude to A. M. Morozov for the preparation of the $CaWO_4$ single crystals with samarium." Orig. art. has: 1 figure and 5 formulas.   [08]

SUB CODE: 20   / SUBM DATE: 29Apr65 / ORIG REF: 001 / OTHER REF: 003 /
ATD PRESS:
Card 1/1

L 30100-66   EWT(m)/T/EWP(t)/ETI   IJP(c)   JD/JG

ACC NR: AP6012518   SOURCE CODE: UR/0181/66/003/004/1308/1309

AUTHORS: Antipin, A. A.; Kurkin, I. N.; Shekun, L. Ya.

ORG: Kazan' State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: EPR of holmium in single crystal $PbMoO_4$

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1308-1309

TOPIC TAGS: holmium, epr spectrum, lead compound, molybdate, hyperfine structure, line width

ABSTRACT: The authors investigated $PbMoO_4$ single crystals grown by the Czochralski method and containing nominally 0.5% of Ho^{17}. At 4.2K they observed an EPR spectrum which undoubtedly belongs to $Ho^{3+}(4f^{10})$. The spectrum consists of eight hyperfine-structure lines due to Ho^{167}. Their position, in accordance to measurements at frequencies from 10 to 35 Gcs, are described by a spin Hamiltonian

$$\mathcal{H} = g_{\parallel}\beta H_z S_z + A I_z S_z$$

Card   1/2

L 30100-66

ACC NR: AP6012518 /

with effective spin S = 1/2 and with constants

$$g_{\parallel} = 14.05 \pm 0.05,$$
$$A = (0.308 \pm 0.005) \ cm^{-1}.$$

The Ho^{3+} line intensity is found to be weaker than that of equal amounts of Pb^{3+}. The lines were somewhat asymmetrical and had an approximate width of 70 Oe. The authors thank A. M. Morozov for preparing the samples of $PbMoO_4 \cdot Ho$. Orig. art. has: 2 formulas.

SUB CODE: 20/ SUBM DATE: 27Nov65/ ORIG REF: 002/ OTH REF: 002

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ACC NR: AP6018532   SOURCE CODE: UR/0181/66/008/006/1717/1724

AUTHOR: Shekun, L. Ya.

ORG: Kazan' State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: Theory of optical spectrum and paramagnetic resonance of the Nd^{3+} ion in PbMoO4 single crystals

SOURCE: Fizika tverdogo tela, v. 8, no. 6, 1966, 1717-1724

TOPIC TAGS: optic spectrum, lead compound, molybdate, electron paramagnetic resonance, activated crystal, Stark effect, electron spin, Hamiltonian

ABSTRACT: The article is devoted to a theoretical interpretation of the experimental results obtained by Ya. E. Kariss and P. P. Feofilov on the optical spectrum of single-crystal PbMoO4:Nd (Opt. i spektr. v. 17, 718, 1964), and also the results of the author's own investigation (with I. N. Kurkin, FTT v. 6, 1462, 1964) of electron paramagnetic resonance of the Nd^{3+} ion in PbMoO4. To this end, the crystalline Stark effect of the Nd^{3+} in the PbMoO4 is calculated with the aid of the even component of the crystal-field potential

$$V_{even}(D_{2d}) = B_2^0 V_2^0 + B_4^0 V_4^0 + B_8^0 V_8^0 + B_4^4 V_4^4 + B_8^4 V_8^4$$

for which the parameters are found to be $B_2^0 = +260$, $B_4^0 = -83$, $B_8^0 = -10$, $B_4^4 = -750$, and $B_8^4 = -500$ cm^{-1}. This potential describes satisfactorily the experimentally obtained

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sublevels of the ^4I_J and $^4F_{3/2}$ terms, with average deviation from 4 to 10 cm^{-1}. The wave functions with allowance for J-mixing are determined and are used to obtain a spin Hamiltonian with parameters that agree well with the EPR experiment. Comparison of the theoretical picture of the emission-spectrum polarization with experiment indicates that the crystalline field has a symmetry S_4 or D_{2d}. The author thanks P. P. Feofilov for continuous interest, S. A. Al'tshuler and A. M. Leushin for advice and discussions, and I. N. Kurkin, O. I. Tyapina, and M. V. Yeremin for great help with the work. Orig. art. has: 1 figure, 14 formulas, and 1 table.

SUB CODE: 20/   SUBM DATE: 01Nov65/   ORIG REF: 008/   OTH REF: 009

Card 2/2

ACC NR: AP6018741

SOURCE CODE: UR/0057/66/036/006/1118/1120

AUTHOR: Antipin, A.A.; Kurkin, I.N.; Livanova, L.D.; Potvorova, L.Z.; Shekun, L.Ya.

ORG: Kaza n' State University im. V.I.Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: EPR in calcium, strontium, and barium fluoride crystals containing samarium

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 6, 1966, 1118-1120

TOPIC TAGS: EPR, calcium, strontium, barium, samarium, fluoride, single crystal, crystal growing, EPR spectrometry

ABSTRACT: The EPR spectra of CaF_2:Sm, SrF_2Sm, and BaF_2Sm crystals were investigated at 4.2 °K with an EPR spectrometer operating in the 3 and 10 cm wavelength regions. The crystals were grown under a variety of conditions, and both colorless crystals and crystals showing the characteristic tint due to the presence of Sm^{2+} ions were obtained. The only tetragonal Sm^{3+} centers observed in CaF_2:Sm were those with $g_{\parallel} = 0 \pm 0.6$ and $g_\perp = 0.823 \pm 0.003$. The tetragonal Sm^{3+} centers reported by M.J.Weber and R.W.Bierig (Phys.Rev., 134, No. 6A, 1492, 1964) and W. Lowe (Phys. Rev., 134, No. 6A, 1479, 1964) were not confirmed. In SrF_2:Sm there were observed tetragonal Sm^{3+} centers with $g_{\parallel} = 0 \pm 0.06$ and $g_\perp = 0.829 \pm 0.002$, and in the best samples it was possible to resolve the hyperfine structure due to the Sm isotopes. No resonances that could be ascribed to Sm^{3+} were observed in BaF_2:Sm, although many crystals grown under a wide variety of conditions were examined and resonances with g-factors as low as 0.2 or 0.3 would have

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ACC NR: AP6018741

been detected. It is suggested that the absence of Sm^{3+} EPR in BaF_2:Sm may be due to the Sm^{3+} centers having trigonal rather than tetragonal symmetry in that host: in a cubic field the ground state Γ_8 quartet contains a nonresonating Kramers doublet that could be depressed to ground position by distortion of the field along the C_3 axis.   It is suggested that there may be trigonal Sm^{3+} centers in CaF_2:Sm and SrF_2:Sm also.   Orig. art. has: 2 formulas and 1 figure.

SUB CODE: 20 /   SUBM DATE: 16Jul65 /   ORIG. REF: 003 / OTH REF: 005.

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L 06267-67   EWT(m)/EWP(t)/ETI   IJP(c)   JD/JG

SOURCE CODE: UR/0181/66/008/009/2808/2809

ACC NR: AP6030982

AUTHOR: Antipin, A. A.; Kurkin, I. N.; Potkin, L. I.; Shekun, L. Ya.

ORG: Kazan State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: Paramagnetic resonance of Ce^{3+} and Yb^{3+} in $BaMoO_4$ single crystals

SOURCE: Fizika tverdogo tela, v. 8, no. 9, 1966, 2808-2809

TOPIC TAGS: EPR, cerium, ytterbium, barium compound, molybdate

ABSTRACT: EPR measurements of Ce^{3+} and Yb^{3+} were made at 4.2°K on $BaMoO_4$ single crystals, which have the most elongated cell of all crystals in the scheelite homologous series. The rare earth ion was present in the amount of 0.1% and entered chiefly into the composition of the tetragonal centers. The constants of the spin Hamiltonian of Ce^{3+} ion, determined at ~10 kMc, were found to be

$$Ce^{3+}\begin{cases} g_\parallel = 2.637 \pm 0.004; \\ g_\perp = 1.541 \pm 0.003. \end{cases}$$

For the Yb^{3+} ion, only one of the principal orientations, $H \perp z$, could be observed.
The corresponding parameters of the spin Hamiltonian are

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ACC NR: AP6030982

$$Yb^{3+}\begin{cases} g_\perp = 3.91 \pm 0.01; \\ B^{171} = 3111 \pm 20 \ Mc \\ B^{173} = 860 \pm 10 \ Mc \end{cases}$$

As the $H \| z$ orientation was approached, the lines broadened markedly, and for this reason the spectrum of Yb^{3+} at frequencies of ~9 and ~3 kMc could not be observed in this orientation. From the angular dependence of the spectrum it is concluded that

$$g_\| = 0.43 \pm 0.04.$$

SUB CODE: 20/ SUBM DATE: 07Apr66/ ORIG REF: 005/ OTH REF: 002

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